

## CLAIMS

### I CLAIM:

- 5           1.       A solenoid control valve for use in supplying pressure control to a gas turbine bleed valve, comprising:
- a housing said housing having a supply inlet, major channel, minor channel, and vent to provide fluid communication within said housing;
- a ball pilot valve disposed within said housing;
- 10           an arm moveably disposed within said housing said arm capable of contacting and moving the ball of said pilot ball valve;
- a dual coil solenoid disposed within said housing capable of an energized mode and a deenergized mode and configured so as to move said arm when in the energized position;
- 15           biasing means positioned within said dual coil solenoid positioned so as to tend to force said arm against said ball and thereby tending to restrict fluid movement through said pilot ball valve;
- an actuator chamber in fluid communication with said housing through said minor channel and said major channel, said actuator chamber further having a control
- 20           port and an outlet port;
- an actuator moveably positioned within said actuator chamber, said actuator having a major surface, a minor surface, a fill seat, and a vent seat;

2. The solenoid valve of claim 1 wherein said major surface and minor surface are configured whereby fluid pressure admitted through said supply inlet passes through said major channel to act on said major surface and passes through said minor channel to act on said minor surface to cause movement of said actuator.
3. The solenoid valve of claim 2 wherein the movement of said actuator stops when said vent seat contacts said vent contact.
4. The solenoid valve of claim 2 wherein the movement of said actuator opens fluid communication between said supply inlet and said control port.
5. The solenoid valve of claim 1 wherein fluid pressure admitted through said supply inlet passes through said minor channel and is restricted from passing through said pilot ball valve so that fluid pressure acts on said minor surface of said actuator thereby to cause movement of said actuator.
6. The solenoid valve of claim 5 wherein the movement of said actuator stops when said fill seat contacts said fill contact.
7. The solenoid valve of claim 5 wherein fluid pressure acting against said major surface of said actuator is released through said vent of said housing.

8. The solenoid valve of claim 5 wherein said control port and said outlet port of said actuator chamber are in fluid communication when said fill seat of said actuator contacts said fill contact.
- 5 9. The solenoid valve of claim 1 further comprises a filter to filter air admitted into said housing through said supply inlet.
- 10 10. The solenoid valve of claim 1 wherein said pilot ball valve is configured so that when said dual coil is in the deenergized mode, said biasing means moves said arm against said ball thereby restricting fluid passage through said pilot ball valve.
- 15 11. The solenoid valve of claim 1 wherein said pilot ball valve is configured so that when said dual coil is in the energized mode said ball is free to move within said pilot valve so that fluid pressure from said supply inlet causes said ball to move thereby permitting fluid passage through said pilot ball valve.
- 20 12. A solenoid control valve comprising:  
a housing said housing defining a valve chamber and an actuator chamber said housing having a supply inlet to receive fluid and a vent;  
an actuator disposed within said actuator chamber said actuator defining a major surface and a minor surface said actuator further capable of moving between an open and closed position;

a minor channel providing fluid communication between said valve chamber and minor surface of said actuator;

a major channel providing fluid communication between said valve chamber and major surface of said actuator;

- 5           a pilot valve disposed within said housing said pilot valve capable of being in an open or a closed position;
- a ball within said pilot valve;
- means for opening and closing said pilot valve.

10       13.   The valve according to claim 12 wherein said means for closing comprises at least one solenoid and plunger.

14.   The valve according to claim 12 wherein said means for closing comprises a dual coil solenoid configured to contract when in the energized mode.

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15.   The solenoid control valve of claim 12 wherein said housing and said actuator chamber are a unitary piece.

16.   The solenoid control valve of claim 12 wherein said actuator chamber further  
20       comprises a control port and an outlet port.

17.   A solenoid control valve comprising:

a housing said housing having a supply inlet for receiving fluid and a vent for allowing fluid to exit said housing;

an actuator chamber;

an actuator disposed within said actuator chamber, said actuator having a major surface and a minor surface;

a major channel providing fluid communication between said housing and the major surface of said actuator;

a minor channel providing fluid communication between said housing and the minor surface of said actuator;

means for controlling the passage of fluid from said housing to said major surface of said actuator wherein said means for controlling has an open and closed state and wherein the open state allows passage of fluid from said housing and the closed state restricts the passage of fluid from said housing; and

a solenoid array disposed within said housing said solenoid array capable of receiving electrical current to place said solenoid array in an energized state and said housing being in a de-energized state when said solenoid array does not receive electrical current and wherein said solenoid array in an energized state opens said means for controlling and said solenoid array in a de-energized state closes said means for controlling.

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18. The solenoid control valve of claim 17 wherein said means for controlling comprises a pilot valve and ball.

19. The solenoid control valve of claim 17 further comprising an arm disposed within said solenoid array to act on said means for controlling.

20. A method for regulating passage of fluid pressure in a gas turbine engine comprising the steps of:

providing fluid pressure to a housing through a supply inlet such that said fluid pressure is restricted from flowing through a pilot ball valve positioned in said housing;

energizing a dual coil solenoid thereby moving an arm whereby the ball of said pilot ball valve is allowed to move within said pilot ball valve;

passing said fluid pressure through said pilot ball valve and through a major channel whereby said fluid pressure acts on a major surface of an actuator;

passing said fluid pressure through a minor channel whereby said fluid pressure acts on a minor surface of an actuator; and

moving said actuator into an open position whereby fluid pressure is allowed to flow through a control port.

21. The method of claim 20 further comprising moving said actuator until a vent seat contacts a vent contact.

22. The method of claim 20 further comprising the step of de-energizing said dual coil solenoid whereby an arm is moved against said ball thereby restricting fluid pressure from passing through said pilot ball valve.

23. The method of claim 20 further comprising the step of moving said actuator to a closed position whereby fluid pressure is restricted from flowing through a control port.

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24. The method of claim 23 wherein the step of moving said actuator continues until a fill seat contacts a fill contact.

25. The method of claim 20 further comprising the step of passing the fluid pressure acting on said major surface through said pilot ball valve and through a vent.

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26. The method of claim 20 further comprising the step of passing pressurized fluid through a control port into an actuator chamber and out through an outlet port.

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